

Are We Prepared for Hybrid Warfare?  
EWS Contemporary Issue Paper  
Submitted by Captain J. Q. Kenney  
to  
Major D. R. Everly, CG 8  
19 February 2008

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>19 FEB 2008</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2008 to 00-00-2008</b>	
4. TITLE AND SUBTITLE <b>Are We Prepared for Hybrid Warfare?</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>United States Marine Corps,Command and Staff College, Marine Corps University,2076 South Street, Marine Corps Combat Development Command,Quantico,VA,22134-5068</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>16</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

A growing number of anti-American threats exist in irregular form within unexpected, underdeveloped crevices throughout the world rather than as conventional peer competitors. This pliable enemy not only eludes conventional fights, but blends a profusion of conventional and asymmetric warfighting capabilities in a dynamic, population dense battlespace. Despite indications and warnings of these ecdysial changes, our nation's military planners have historically provided technology-based solutions that minimize manpower, streamline logistics, and maximize firepower, rather than understanding and exploiting this evolving foe. Successfully combating these irregular, or "hybrid," enemies requires the United States Marine Corps (USMC) to shift from its current conventional warfare mindset to a non-traditional approach when manning, educating, and training the force in order to address the future's preeminent threat.

Resourceful hybrid foes of the future will follow Sun Tzu's principle, "avoid strengths, attack weaknesses," and undoubtedly seek to reduce our technological superiority, blunt our firepower, subjugate our ideals abroad through targeted strategic communications, and destroy our collective political will, absent the quest to physically seize or occupy U.S.

territory.<sup>1</sup> They will "blend the lethality of state conflict with the fanatical and protracted fervor of irregular warfare."<sup>2</sup>

This dramatic morphing from a state-representing, uniformed enemy that marches in column and fights according to an established doctrine, to a faceless mass of shadowy zealots that employ amalgamations of various warfighting strategies (ranging from China's "unrestricted warfare" doctrine<sup>3</sup> to "conventional, irregular, catastrophic, and disruptive" challenges<sup>4</sup>), underscores the evolving nature of the threats facing the United States.

These custom-designed, hybrid enemies include states blending high-tech capabilities such as anti-satellite weapons with terrorism and cyber-warfare directed against

---

<sup>1</sup> Sun Tzu's quote and reference to political will cited in "Brains, Not Bullets," *The Economist*, 27 October - 02 November 2007, 33.

<sup>2</sup> LtGen James N. Mattis and Frank G. Hoffman, "Future Warfare: The Rise in Hybrid Wars," *Proceedings* 132, no. 1233, November 2005, 18-19, <http://milnewstbay.pbwiki.com/f/MattisFourBlockWarUSNINov2005.pdf>, accessed 12 December 2007.

<sup>3</sup> "Unrestricted Warfare" (translated, "warfare beyond bounds") is a book on Chinese military strategy that focuses on how a nation such as China can defeat a technologically superior opponent (i.e., the United States) through a variety of means. The doctrine advocates, "The first rule of unrestricted warfare is that there are no rules, with nothing forbidden." Rather than focusing on direct military confrontation, this book examines a variety of other means, to include computer network attacks, electronic and economic warfare, and legal mechanisms to place one's opponent at a disadvantage and circumvent the need for direct military action. Qiao Liang and Wang Xiangsui, *Unrestricted Warfare*, Translated by FBIS (Beijing: PLA Literature and Arts Publishing House, February 1999).

<sup>4</sup> "Traditional challenges are posed by states employing recognized military capabilities and forces in well understood forms of military competition and conflict. Irregular challenges come from those employing "unconventional" methods to counter the traditional advantages of stronger opponents. Catastrophic challenges involve the acquisition, possession, and use of WMD or methods producing WMD like effects. Disruptive challenges may come from adversaries who develop and use breakthrough technologies to negate current U.S. advantages in key operational domains." Department of Defense, *The National Defense Strategy of the United States of America*, March 2005, <http://www.defenselink.mil/news/Mar2005/d20050318nds2.pdf>, accessed 16 December 2007, 2-4.

financial targets..."A world of asymmetric and ethno-political warfare in which machetes and Microsoft merge, and apocalyptic millenarians wearing Reeboks and Ray Bans dream of acquiring WMD." [Although low-tech on the surface, non-state actors] will be capable of what could be called "advanced irregular warfare," with access to encrypted command systems, man-portable air defense missiles (MANPADS), and other modern lethal systems. Enemies will be protean in their structure and tactics and may even be leaderless. They may elect a more cellular structure, with greater autonomy and less connectivity than formal networks, as did the perpetrators of the March 2004 Madrid bombings and the July 2005 London bombings. They may employ hybrid structures where specific capabilities or financial support is provided to local cells to augment their functional capability for a single mission. Such hybrid structures will likely mix legitimate commercial work with criminal energy. Cunning savagery and organizational adaptation will be the only constant.<sup>5</sup>

Furthermore, not only will this emerging enemy most likely conduct their illicit activities amongst robust and developing populations, but also potentially within the sphere of ongoing U.S./U.S.-partnered humanitarian and/or stability operations. This undesirable behavior would unquestionably pose an even greater challenge for U.S. forces combating these entities while concurrently aiding the needy.

The Second Lebanon War in 2006 demonstrated the potency of a sophisticated hybrid enemy against a conventional military juggernaut. The Iranian-funded paramilitary forces of Hezbollah clashed with the Israeli Defense Forces' (IDF) shock and awe tactics in Northern Israel and Southern Lebanon. Hezbollah

---

<sup>5</sup> Frank G. Hoffman, "Complex Irregular Warfare: The Next Revolution in Military Affairs," *Foreign Policy Research Institute*, Summer 2006, 398.

successfully combined the use of anti-tank missiles, 122 mm Katyusha rockets, and guerrilla warfare with a robust information operations plan against an underestimating, kinetically-minded IDF. Despite the IDF's stated strategic goals of "retrieving its seized soldiers and destroying the military capability of Hezbollah," Hezbollah's asymmetrical strategy trumped the IDF's tactical effectiveness, and ultimately led to the Israeli government's embarrassing strategic defeat.<sup>6</sup> Colonel Thomas X. Hammes, USMC, summarized Hezbollah's victorious strategy:

During the fighting, (Hezbollah) focused on not damaging Israel, but on insuring they were perceived as defying the most powerful army in the Middle East...Once the fighting stopped, Hezbollah showed an even greater grasp of strategic communications. While the West was convening conferences to make promises about aid at some future time, Hezbollah representatives hit the streets with cash money and physical assistance. The message was clear--Hezbollah was sovereign in its territory and focused on its people.<sup>7</sup>

As the United States' primary instrument of power projection, the USMC will undoubtedly find itself in underdeveloped locations around the world entwined with these crossbred threats. In order to combat such threats, USMC leaders must adequately prepare Marines to wage war beyond the conventional scope.

---

<sup>6</sup> "2006 Lebanon War", *Wikipedia*, [http://en.wikipedia.org/wiki/2006\\_Lebanon\\_War](http://en.wikipedia.org/wiki/2006_Lebanon_War), accessed 18 December 2007

<sup>7</sup> Col Thomas X. Hammes, USMC (Ret.), "Fourth Generation Warfare Evolves, Fifth Emerges," *Military Review*, May-June 2007, 15, [http://www.d-n-i.net/fcs/pdf/hammes\\_5gw.pdf](http://www.d-n-i.net/fcs/pdf/hammes_5gw.pdf), accessed 13 December 2007.

## Personnel Requirements

(T)he West's all volunteer forces have progressively cut expensive manpower in favor of technology. They have become infinitely better at finding and destroying things; but the best source of intelligence on the ground is often the soldier on the street.<sup>8</sup>

On 11 January 2007, Secretary of Defense (SECDEF), Robert Gates, announced a "permanent boost in the size of the Army and Marine Corps," increasing the USMC's end strength to 202,000 (202K), thereby providing USMC leaders with a rare opportunity to dramatically reshape the force.<sup>9</sup> Aside from reorganizing portions of the force structure and adding some much needed capabilities, the Commandant of the Marine Corps (CMC) plans to proportionally increase the force size and "build capacity so the USMC can train and respond to crises *other than irregular warfare*."<sup>10</sup> While 202K establishes the conditions to sustain the currently high operational tempo (OPTEMPO) with existing capabilities, the plan fails to fully leverage the opportunity against future threats.

If the USMC plans to remain relevant in combating emerging threats where "the most important factor defining military

---

<sup>8</sup> *The Economist*, 27 October - 02 November 2007, 36.

<sup>9</sup> Ann Scott Tyson and Josh White. "Pentagon Chief Seeks Bigger Army, Marine Corps." *Reuters*, 11 January 2007 12:38pm, <http://www.reuters.com/article/latestCrisis/idUSN11402636> (accessed 16 December 2007).

<sup>10</sup> LtGen James F. Amos, Deputy Commandant, Combat Development and Integration, Total Force Structure Division PPT, "Rehearsal of Concepts Drill," 9 August 2007 v6, slide #4.

power" is "the ability to collect, communicate, process, and protect information,"<sup>11</sup> simply developing three balanced MAGTFs will not be sufficient. Although the CMC directed the creation of an organic information operations (IO) capability in his 202K plan, the asset would remain at the MEF level and would likely reach down to the infantry battalion level only under certain circumstances. Since infantry battalions will undoubtedly operate in population dense environments where information tailoring and exploitation could be the factor that determines mission success, 202K must establish the conditions to provide an IO capability to each forward deployed infantry battalion.

Language comprehension and cultural awareness are paramount for successful interaction amongst foreign populations. However, acquiring cultural/linguist subject matter experts (SME) within operating units can be impractical considering the depth and breadth of the knowledge required. As a result, developing the organic capability in a rapidly changing environment has fallen short of expectations.

To augment this SME deficiency within the MAGTF, the USMC should enlist linguists/cultural specialists much the same as band members of the "President's Own" are recruited.<sup>12</sup> Personnel would be recruited from the academic community while still

---

<sup>11</sup> Ibid.

<sup>12</sup> "United States Marine Corps Band", *Wikipedia*, [http://en.wikipedia.org/wiki/United\\_States\\_Marine\\_Band](http://en.wikipedia.org/wiki/United_States_Marine_Band), accessed 18 December 2007.



having to meet basic security and physical criteria. Instead of attending boot camp, they would attend a USMC familiarization course (similar to "knife and fork school" for the Naval Medical Corps), receive the rank of Staff Sergeant, and receive "non-transferable" status from their primary military occupational specialty (MOS). In addition, Officers would be drawn and commissioned from their field while commanders would be sourced from the intelligence community. These highly specialized Marines could then augment the MAGTF at every level as a fully integrated organic element rather than an inherently limited government contractor whose security clearance, knowledge of MAGTF planning/operations, and ability to integrate full-time into the units creates a deficiency within the MAGTF.

### **Training, Education, & Doctrine**

When it comes to measuring battlefield success, current USMC culture typically defaults to one form, or another, of battle damage assessments (BDA), regardless of the mission type.<sup>13</sup> Consequently, body counts often times serve as the

---

<sup>13</sup> Battle Damage Assessment (BDA): The timely and accurate estimate of damage resulting from the application of military force, either lethal or non-lethal, against a predetermined objective. BDA can be applied to the employment of all types of weapon systems (air, ground, naval, and Special Forces weapons systems) throughout the range of military operations. BDA is primarily an intelligence responsibility with required inputs and coordination from the operators. BDA is composed of physical damage assessment, functional damage assessment, and target system assessment. In Marine Corps usage, the timely and accurate estimate of the damage resulting from the application of military force. BDA estimates physical damage to a

official, or unofficial, measure of effectiveness (MOE) for mission success.

"This focus on destruction results from two traditional concepts of war--annihilate an enemy through outright destruction, or exhaust an enemy before he exhausts you (attrition)."<sup>14</sup> While this approach certainly has its place and is by no means a concept in its twilight, the USMC faces future struggles that cannot afford a kinetic-based MOE.

Although upper echelons of the organization can differentiate which MOE applies to a given situation, adequate training for trigger-pullers lacks across the board. Individual, collective, and leader training must begin during the early stages of a Marines' career to ensure the seed is planted with enough time to blossom.

Even though the FMFM 6-series does not address hybrid threats, FMFM 3-24, *Counterinsurgency*, takes significant steps in providing doctrine that enables Marines to train and fight against an asymmetrical threat. However, according to Frank Hoffman, FMFM 3-24 "still fails to answer the most critical question: how is this relevant to the highly connected,

---

particular target, functional damage to that target, and the capability of the entire target system to continue its operations. Department of the Army, *FM 1-02/MCRP 5-12A (Operational Terms and Graphics)*, September 2004, 1-19.

<sup>14</sup> David A. Deptula, *Effects-Based Operations: Change in the Nature of War*, (Arlington, Virginia: Aerospace Education Foundation, 2001), <http://www.aef.org/pub/psbook.pdf>, 11, accessed 16 December 2007.

religiously inspired, urban dwelling, global guerrilla" who is likely to be encountered in the future battlespace?<sup>15</sup>

The Marine Corps must stray from applying old models or situations to new doctrinal publications as it does a disservice to the decision maker on the ground.<sup>16</sup> Doctrine must serve the operators by providing relevant guidance while establishing the conditions to efficiently determine effective solutions in a fluid, *contemporary* environment; otherwise, it will be shelved in the corner of irrelevance.

### **Counterargument**

Pragmatists cite the need to ready the force for any contingency, whether symmetrical or asymmetrical in nature, and boast that the CMC's 202K plan more than adequately addresses the requirements likely faced in future conflicts. "Focus on the fundamentals and call audibles at the line of scrimmage based off of what you see,"<sup>17</sup> stated Major General Mastin Robeson when describing the manner in which the USMC should prepare for future wars. In short, tunnel vision creates a lack of flexibility that will eventually cause Marine Corps to falter

---

<sup>15</sup> Frank G. Hoffman, "Neo-Classical Counterinsurgency?," *Parameters* 37, no. 2 (Summer 2007), 84, <http://carlislewww.army.mil/usawc/Parameters/07summer/hoffman.htm>, accessed 11 December 2007.

<sup>16</sup> Ibid.

<sup>17</sup> Major General Mastin Robeson, interviewed by Captain Jonathan Q. Kenney, Quantico, Virginia: Expeditionary Warfare School, December 2007.

when addressing future threats, whether irregular or conventional.

However, the SECDEF recently indicated the requirement to devote more resources toward the "non-kinetic aspects of our national power," signaling a much needed shift in the institutional approach toward the requirements necessary to succeed during future military commitments.<sup>18</sup> Becoming the jack of all trades and master of none could prove difficult when attempting to rapidly adjust to a fluid asymmetrical situation. According to Sun Tzu, "When he prepares everywhere he will be weak everywhere."<sup>19</sup>

### **Closing**

In an era where future enemies possess a mix of potent irregular capabilities, the U.S. must adapt to successfully confront these threats. Current transformational efforts within the USMC are not adequate in manning, educating, and training the force as they remain too conventionally minded and must focus more effort in the non-traditional aspects of warfighting, despite the price tag.

The U.S. government currently spends 4 percent of gross domestic product (GDP) on defense expenditures; that number rose

---

<sup>18</sup> *The Economist*, 27 October - 02 November 2007, 36.

<sup>19</sup> Samuel B. Griffin, *Sun Tzu, The Art of War*, Oxford University Press, 1963.

to 9 and 14 percent of GDP during the Vietnam and Korean Wars, respectively.<sup>20</sup> Comparatively speaking to other Western nations, the U.S. greatly exceeds all joint partners in defense spending as a percentage of GDP (and in total dollars spent). These trends are likely to continue for the foreseeable future.

Warfare is an expensive business where the appropriate quantity of resources must be properly allocated if success is to be achieved. Despite the significant expenditures, seeing the forest through the trees, or adjusting to the metamorphosing threat, is an even greater imperative. In the end, what is the cost of not properly preparing?

**1814 words**

---

<sup>20</sup> *The Economist*, 27 October - 02 November 2007, 15.

## Bibliography

- 2006 Lebanon War. *Wikipedia*,  
[http://en.wikipedia.org/wiki/2006\\_Lebanon\\_War](http://en.wikipedia.org/wiki/2006_Lebanon_War) (accessed 18 December 2007).
- After Smart Weapons, Smart Soldiers. *The Economist*, 27 October - 02 November 2007. 33.
- Brain, Not Bullets. *The Economist*, 27 October - 02 November 2007. 15.
- Betz, David. "Redesigning Land Forces for Wars Amongst the People." *Contemporary Security Policy* 28, no. 2 (August 2007): 221-243.
- Bore, Henri. Cultural Awareness and Irregular Warfare: French Army Experience in Africa. *Military Review*, 07/01, 01 June 2006. 108(4),  
<http://find.galegroup.com/itx/infomark.do?&contentSet=IAC-Documents&type=retrieve&tabID=T003&prodId=AONE&docId=A150356904&source=gale&srcprod=AONE&userGroupName=usmcqum&version=1.0>  
(accessed 12/11/2007).
- U.S.-China Economic and Security Review Commission. *Beijing, Unrestricted Warfare, and Threat Potentials*. Beijing's Doctrine on the Conduct of Irregular Forms of Warfare sess., 29 March 2007,  
[http://www.uscc.gov/hearings/2007hearings/written\\_testimonies/07\\_03\\_29\\_30wrts/07\\_03\\_29\\_30\\_bunker\\_statement.pdf](http://www.uscc.gov/hearings/2007hearings/written_testimonies/07_03_29_30wrts/07_03_29_30_bunker_statement.pdf) (accessed 16 December 2007).
- Department of Defense. *The National Defense Strategy of the United States of America*. Department of Defense, March 2005,  
<http://www.defenselink.mil/news/Mar2005/d20050318nds2.pdf>  
(accessed 16 December 2007).
- Department of the Army. *FM 1-02/MCRP 5-12A (Operational Terms and Graphics)*. Department of Defense, September 2004, 1-19.

- Deptula, David A. *Effects-Based Operations: Change in the Nature of War*. Arlington, Virginia: Aerospace Education Foundation, 2001, <http://www.aef.org/pub/psbook.pdf> (accessed 16 December 2007).
- Dugan, James C. "Elusive Armies and Invisible Hands: Combining Conventional and Guerrilla Forces from 1776 to the Present." Naval Postgraduate School Monterey, California, December 1998, <http://handle.dtic.mil/100.2/ADA359567> (accessed 12 December 2007).
- Freier, Nathan. *Strategic Competition and Resistance in the 21st Century: Irregular, Catastrophic, Traditional, and Hybrid Challenges in Context*. Strategic Studies Institute, US Army War College, May 2007, <http://handle.dtic.mil/100.2/ADA468246> (accessed 11 December 2007).
- Griffin, Samuel B. *Sun Tzu: The Art of War*. Oxford University Press, New York, New York, 1963.
- Hammes, Col. Thomas X., USMC (Ret.). "Fourth Generation Warfare Evolves, Fifth Emerges." *Military Review* (May-June 2007): 14-23, [http://www.d-n-i.net/fcs/pdf/hammes\\_5gw.pdf](http://www.d-n-i.net/fcs/pdf/hammes_5gw.pdf) (accessed 13 December 2007).
- Hendricks, Kevin D. *The Lessons of Complexity and Future Warfare*. Army Command and General Staff College, Fort Leavenworth, Kansas, School of Advanced Military Studies, 22 May 2003, <http://handle.dtic.mil/100.2/ADA419837> (accessed 11 December 2007).
- Hoffman, Frank G. "Neo-Classical Counterinsurgency?" *Parameters* 37, no. 2 (Summer 2007): 71-87, <http://carlisle-www.army.mil/usawc/Parameters/07summer/hoffman.htm> (accessed 11 December 2007).
- . "Complex Irregular Warfare: The Next Revolution in Military Affairs." *Foreign Policy Research Institute* 50, no. 3 (Summer 2006): 395-411.

- . "Conflict in the 21st Century." PowerPoint, USMC Command & Staff College (accessed 21 November 2007).
- Liang, Qiao and Wang Xiangsui. *Unrestricted Warfare*. Translated by FBIS. Beijing: PLA Literature and Arts Publishing House, February 1999, <http://www.artofficial-intelligence.com/UW.pdf> (accessed 16 December 2007).
- Mattis, James N. and Frank G. Hoffman. "Future Warfare: The Rise in Hybrid Wars." *Proceedings* 132, no. 1233 (November 2005): 18-19, <http://milnewstbay.pbwiki.com/f/MattisFourBlockWarUSNINov2005.pdf> (accessed 12 December 2007).
- Melillo, Michael R. "Outfitting a Big-War Military with Small-War Capabilities." *Parameters* 36, no. 3 (Autumn, 2006): 22, <http://proquest.umi.com/pqdweb?did=1113581401&Fmt=7&clientId=65345&RQT=309&VName=PQD> (accessed 11 December 2007).
- Nemeth, William J. "Future War and Chechnya: A Case for Hybrid Warfare." Master's Thesis, Naval Postgraduate School Monterey, California, June 2002.
- Robeson, Major General Mastin. Interviewed by Captain Jonathan Q. Kenney, Quantico, Virginia: Expeditionary Warfare School, December 2007.
- US-China Economic and Security Review Commission. *Asymmetric Military Aspirations and Capabilities of the People's Liberation Army of the People's Republic of China*. China's Military Modernization and Its Impact on the United States and the Asia Pacific Region sess., 29-30 March 2007, [http://www.uscc.gov/hearings/2007hearings/written\\_testimonies/07\\_03\\_29\\_30wrts/07\\_03\\_29\\_30\\_schneider\\_statement.pdf](http://www.uscc.gov/hearings/2007hearings/written_testimonies/07_03_29_30wrts/07_03_29_30_schneider_statement.pdf) (accessed 16 December 2007).
- Total Force Structure Division. *Rehearsal of Concepts Drill*. 9 Aug ROCv6(4)\_FINAL.Ppt. PowerPoint ed. Quantico, Virginia: Marine Corps Combat Development Command, 09 August 2007 (accessed 17 December 2007).



—. *FY 07 Executive Summaries*. Exec Summary Sheets 070801V5\_ROC FINAL.Ppt. PowerPoint ed. Quantico, Virginia: Marine Corps Combat Development Command, 01 August 2007 (accessed 17 December 2007).

Tyson, Ann Scott and Josh White. "Pentagon Chief Seeks Bigger Army, Marine Corps." *Reuters*, 11 January 2007 12:38pm, <http://www.reuters.com/article/latestCrisis/idUSN11402636> (accessed 16 December 2007).

United States Marine Corps Band. *Wikipedia*, [http://en.wikipedia.org/wiki/United\\_States\\_Marine\\_Band](http://en.wikipedia.org/wiki/United_States_Marine_Band), (accessed 18 December 2007).

Warren, Paul S. *A New Kind of War: Adaptive Threat Doctrine and Information Operations*. Army Command and General Staff College, Fort Leavenworth, Kansas, School of Advanced Military Studies, February 2001, <http://handle.dtic.mil/100.2/ADA394428>.